

**Before the
Federal Communications
Commission Washington, D. C.
20554**

In the Matter of)
)
Proposed Changes in the Commission’s) ET Docket No. 03-137
Rules Regarding Human Exposure to Radiofrequency)
Electromagnetic Fields)

Comments of Hatfield & Dawson Consulting Engineers, LLC

INTRODUCTION:

Hatfield & Dawson and members of its engineering staff are active participants in the standards-setting process of the C.95 IEEE Committee, and have decades of experience in the calculation and measurement of radio frequency fields. We are therefore well qualified to comment on some specific items included in the Commission’s Notice of Proposed Rulemaking on this matter.

DISCUSSION:

At ¶221 (p. 79) and in Appendix H, item #3 of the NPRM there is discussion of the use of spatial averaging. Properly employed spatial averaging is a valid and important technique. Spatial averaging of measurements results in an assessment of the ambient exposure that is most closely related to the whole body average specific absorption rate (SAR) upon which the IEEE C95.1 and NCRP exposure limits are based. IEEE C95.1 states: “The spatial peak value of the power density or mean squared field strength shall not exceed 20 times the square of the allowed spatially averaged values...” Most instruments used for measurement of RF exposure do not have sufficient dynamic range to cover 20 times the square of the allowed spatially averaged values that are allowed by IEEE C95.1. Therefore most available instrumentation would be inadequate to determine compliance with IEEE C95.1 if peak measurements are required.

The FCC has stated that it does not have the expertise to set human RF exposure limits. Therefore the Commission’s MPE limits for RF exposure are based on IEEE and NCRP guidelines. Both the IEEE and NCRP guidelines were developed by scientists and engineers with a great deal of experience and knowledge in the area of RF biological effects and related issues. Because the FCC does not have the required expertise it should not now seek to modify the IEEE and NCRP exposure guidelines by adopting a new standard based on peak exposure.

The Commission's MPE limits for RF exposure are based on IEEE and NCRP evaluations which are derived from a presumption of a uniform, plane wave exposure over the adult human body. Most RF exposure conditions do not result from perfectly uniform plane waves, thus spatial averaging measurement techniques are normally used to obtain estimates of the plane wave equivalent power density of a non-uniform, spatially distributed field.

Peak field measurements are quicker and easier to obtain, but they overstate exposure conditions, especially in areas where non-uniform RF fields exist. Spatially averaged measurements are more time-consuming, but they yield a more accurate representation of human exposure conditions, and they are in accordance with IEEE Standards C95.1-2005 and C95.3-2002. Thus an efficient measurement procedure calls for the use of spatial averaging only at those locations where peak measurements indicate the possibility of excessive exposure conditions.

Peak measurements are not sufficient to determine compliance. C95.1-2005 states on page 28:

"The spatial peak value of the power density or mean squared field strength shall not exceed 20 times the square of the allowed spatially averaged values (Table 8) at frequencies below 300 MHz, and shall not exceed the equivalent power density of 200 W/m² at frequencies between 300 MHz and 3 GHz, $200 (f/3)^{1/5}$ W/m² at frequencies between 3 and 96 GHz (f is in GHz), and 400 W/m² at frequencies above 96 GHz.

"Compliance with Table 9 (lower tier) is determined from spatial averages of power density or the mean squared electric and magnetic field strengths over an area equivalent to the vertical cross section of the human body (projected area) at a distance no closer than 0.2 m from the field source. The spatial peak value of the power density or mean squared field strength shall not exceed 20 times the square of the allowed spatially averaged values (Table 9) at frequencies below 400 MHz."

As noted by Motorola in its comments, quoted by the Commission in the NPRM;

"...if there are areas where this standard is unclear or requires interpretation, the Commission should bring this to the attention of the IEEE before adopting its own specific techniques or procedures through rule-making."

CONCLUSION

The commission would be well advised to adopt the latest version of IEEE ICES C95.1 which is based upon a *“continuing rigorous and open scientific process that is transparent at all levels and includes the opportunity for input from all stakeholders”* (this quote is from page 30 of IEEE Std C95.1-2005). In comparison, other standards for electromagnetic safety are based upon the findings of closed and elitist groups that allow little input from interest groups and stakeholders.

In addition, spatially averaged measurements should be the recommended means of determining compliance with human RF exposure limits as required by IEEE Std C95.1-2005

Hatfield & Dawson Consulting Engineers, LLC

A handwritten signature in blue ink, appearing to read "Benj. F. Dawson III", with a stylized flourish at the end.

by Benj. F. Dawson III, P.E. President